REMARKS

Claims 1-22 are now pending in the application. The amendments to the claims contained herein are of equivalent scope as originally filed and, thus, are not a narrowing amendment. The Examiner is respectfully requested to reconsider and withdraw the rejections in view of the amendments and remarks contained herein.

The applicant's invention provides a video segmentation system for automatic video indexing by identifying both abrupt and gradational transitions of shots. The Applicant's invention utilizes a frequency decomposer, such as a wavelet decomposer, to generate at least one wavelet low frequency signature and at least one wavelet high frequency signature of two adjacent frames. Additionally, the applicant's invention includes a data structure for storing said low wavelet frequency signature and said high wavelet frequency signature into a matrix representing wavelet transform coefficients, wherein said low frequency signature and said high signature of two adjacent frames are compared and an S-distance is generated. The S-distance is a measurement of a distance between the two adjacent frames in the wavelet domain, where the S-distance gives a measurement of how many significant low frequency signatures and high frequency signatures the two adjacent frames have in common. Thus, based on the at least one low frequency signature, the at least one wavelet high frequency signature and the S-distance, shot transitions are determined.

REJECTION UNDER 35 U.S.C. § 102

Claims 1-17 stand rejected under 35 U.S.C. § 102(a) as being anticipated by Yu et al. (A Hierarchical Multiresolution Video Transition Scheme) (herein refered to as Yu Publication). This rejection is respectfully traversed.

The Applicant respectfully request that the Examiner withdraw its rejection under 35 U.S.C § 102(a) based upon the Yu Publication. 35 U.S.C § 102(a) states, "a person shall not be entitled to a patent *unless the invention was known or used by **others** in this country*, or patented or *described in a printed publication in this or a foreign country, **before the invention thereof by the applicant for patent***." "The term 'others' refers to any entity which is different from the inventive entity. The entity need only differ by one person to be 'by others.'" See MPEP 2131 III. Additionally, the MPEP states that an Applicant's disclosure of his or her work within the year before the application filing date cannot be used against him or her under 35 U.S.C. 102(a). Moreover, if an applicant is a co-author of a work (an article or publication) cited by an Examiner against a pending patent application, the Applicant can rebut or have the prior work removed by submitting a declaration establishing that the article is describing the applicant's own work. See MPEP §2132.01 pg. 2100-78 to 79.

In this case, Hong Heather Yu and Wayne Wolf appear to be listed on the cover as co-authors of the Yu Publication. The Applicant rebuts the presumption that the work was known by others by attaching a true copy of the Applicant's declaration under 37 C.F.R. § 1.131 stating that the Yu Publication describes the Applicant's own work and

that it was published less than one year before filling for a patent application. Furthermore, included in Appendix A is a statement from Cindy MacDonald, a manager at the publisher, supporting the Applicant's assertion that the article was published less than one year from the date the patent application was filed. Therefore, since the application is the Applicant's own work and that work was published less than one year prior to filing the application, this work can not used against the Applicant. Thus, Examiner is respectfully requested to reconsider and withdraw the rejections in view of the amendments and remarks contained herein.

REJECTION UNDER 35 U.S.C. § 103

Claims 1-4, 6-10, and 13 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Niikura et al. (U.S. Pat. No. 5,911,008) in view of Hewlett (U.S. Pat. No. 5,508,750) in view of Jafarkhani at el. (U.S. Pat. No. 6,542,619). This rejection is respectfully traversed.

The Applicants have amended Claim 1 to include "a wavelet low frequency" signature and "a wavelet high frequency signature." The Examiner has cited the Niikura reference against claims 1-4, 6-10 and 13. Niijura is directed generally to detecting shout boundaries in compressed video data using a DC component and a number of pixels in a frame. See column 1 lines 9-11 and col. 18 lines 10-14. However, Niikura does not disclose the generating of "a **wavelet** low frequency signature." Therefore, the Applicant's respectfully request that the Examiner remove this rejection.

Additionally, Niikura is silent regarding "a high frequency signature" generated by the frequency decomposer as stated in Claim 1, "a high frequency signature for each of said plurality of frames." Moreover, it would appear that Niikura teaches away from using a high frequency component, since as the Examiner stated Niiikura knows "a high frequency component is created," but chooses to only use and mention the low frequency component. See 4/6/2005 Office Action, page 5. Additionally, the Examiner noted that Niikura fails to disclose "a cut detector...that identifies a cut transition between two adjacent frames using said low frequency signature." See 4/6/2005 Office Action page 5. Furthermore, Niikura does not mention a "cut detector" or the detecting of a cut transition. Niikura discloses removing noise caused by a camera or imaging target to emphasize a shot boundary. See column 18, lines 31-45. A cut transition is generally described as an abrupt or discontinuous shot transition where a sudden change of a scene occurs. See Yu Publication page 197. Niikura illustrates or appears to illustrate **not** the detecting of a cut transition, but how to avoid detecting noise as a shot transition by using "a prominence filter." See column 8, lines 31-44. Therefore Niikura fails to disclose or teach "a cut detector" or "a cut transition". Additionally, Niikura fails to mention or teach the combining or use of both a high and a low frequency component to determine different shot transitions, such as stated in claim 1, "a cut transition between two adjacent frames using said low frequency; and . . . a fade transition using high frequency signature. . . "

Furthermore, the Examiner cites Hewett against claim 1 in conjunction with Niikura as "a cut detector...that identifies a cut transition between two adjacent frames

using said low frequency signature." Hewett is concerned with encoding data that has been previously converted from a film frame rate to a faster video frame rate or encoding data which has under gone a 3:2 pull-down conversion. See column 1, lines 51-65 and column 3, lines 15-25. Hewett discloses a cut detection method for scene detection as part of the process for the encoding method of the invention. The method of cut detection, Heweltt states, is detecting a cut transition based on low frequency values on a frame to frame basis by transforming pixel values of each frame into frequency domain values. Hewett, however, fails to mention, teach or disclose a frequency decomposer generating "a **wavelet** low frequency signature" for each of said plurality of frames or detecting a cut transition based on either "a **wavelet** low frequency signature" or "a **wavelet** high frequency signature." Additionally, while Hewett mentions that "various scene cut detection methods can correctly parse the data in most cases," Hewett fails to mention any shot detection method employing "a **wavelet** high frequency signature" or even simply "a high frequency signature" to detect a shot transition. Moreover, Hewett fails to mention or teach a benefit or possibility of combining both "a low frequency signature" and "a high frequency signature" to determine different shot transitions. Furthermore, Hewett does not disclose, "a fade detector that identifies a fade transition using said high frequency." Therefore, Hewett cannot be combined with Niikura to render Claim 1 obvious. Thus, Applicants respectfully request that the Examiner reconsider and remove this rejection.

Although Hewett does not disclose, "a fade detector that identifies a fade transition using said high frequency," the Examiner cites Jafarkhani in combination with

Hewlett and Niikura as disclosing this group of elements of the claimed invention. Jafarkhani is concerned, in general, with detecting scene changes using a wavelet transformer and spectral analysis based **only** on the high frequency component. See column 3, lines 1-14. Based on the collected data concerning the high frequency component at different periods of time, Jafarkhan determines a fade transition. See column 3, lines 36-44. However, Jafarkhan does not disclose "identifying a fade transition using said high frequency signature between two adjacent frames." See Id. Thus, Jafarkhani does not disclose "a fade detector... identifying a fade transition using said high frequency signature between two adjacent frames." Therefore, Applicant respectfully requests the Examiner to reconsider and withdraw this rejection.

Additionally, Jafarkhan does not disclose, mention or teach the combining of "the high frequency signature" and "the low frequency signature" to detect different shot transitions. Nor does Jafarkhan mention any benefits or incentives for doing so, just the opposite Jafarkhan states that "any embodiment of the present invention, the output of interest from the wavelet transformers is the high frequency component of the projection." See column 3, lines 1-11. Additionally, Jafarkhan teaches away from using a low frequency signal by disclosing detecting a scene change by using only "**a one dimensional signal**", a high frequency component, and evaluating that high frequency signal as a function of time. See column 2, lines 10 – 22. Thus, like Niikura and Hewlett, Jafarkhan does not suggest, mention or teach the using or incorporating of both the high and the low frequencies to determine different shot transitions as disclosed in Claim 1 of the Applicant's invention. Therefore, Jafarkhan could not be

combined with Niikara and Hewlett to render Claim 1 obvious. Moreover, Jafarkhan, Niikara and Hewlet would not separately or combined lead an inventor to subject matter stated in Claim 1.

Additionally, since neither Hewlet, Niikura, nor Jafarkhan separately or combined teach, mention or disclose using "a wavelet low frequency signal" to determine "a cut transition", the claim subject matter in Claim 1 is not obvious. Therefore, Applicant respectfully requests the Examiner to reconsider and remove this rejection.

Thus, Applicant believes that this claim is ready for allowance based on the above amendments in combination with other elements recited in the claims and reasons stated above. It is respectfully submitted that Claim 1, along with claims 2-17 which depend on Claim 1, defines over subject matter in Nikura, Hewlett and Jafarkhan. Thus, Applicant respectfully requests the Examiner to reconsider and withdraw this rejection.

Claim 21 stands rejected under 35 U.S.C § 103(a) as being unpatentable over both Niikura and Hewlett and further in view of Brechner (U.S. Pat. No. 6,477,269 B1). Applicants have now amended claim 21 to include "a wavelet low frequency signature". As previously stated, neither Niikura nor Hewlett disclose, mention or teach the using of "a wavelet low frequency" or "detecting a cut transition using a wavelet low frequency". Additionally, Niikura and Hewlett are both fully discussed above and for at least same

reasons as cited above, Applicant requests that the Examiner withdraw and reconsider his rejection.

Additionally, Brechner is cited by the Examiner as teaching that a Haar transform is simple to implement and provides fast computations. Brechner is concerned with a method and system for "searching a clip catalog containing a plurality of image clips to find images similar to a selected image based on color and/or shape." See column 3, lines 23 – 32. The system and method uses wavelet (or shapes) and color signatures to search for related image clips based on the selected image. See column 5, lines 17-47. Unlike Brechner, Claim 21 discloses, "a video segmentation system comprising...a frequency decomposer...that generates a low frequency signature for each of said plurality of frames;...wherein said frequency decomposition employs wavelet decomposition using Haar transform." However, Brechner fails to disclose a frequency decomposer, such as a wavelet decomposer using Haar transform, that generates a low frequency signature for a plurality of frames in a video segmentation system, as claimed in the invention by Claim 21. Moreover, Brechner fails to teach or suggest the combining of a wavelet decomposer using Haar transformer to generate a low frequency signature for a plurality of frames in order to determine a shot transition, such as "**a cut transition**", such as stated in Claim 21, "a frequency decomposer...that generates a low frequency signature for each of said plurality of frames; a cut detector connected...to said frequency decomposer that identifies a cut transition between two adjacent frames using said low frequency." Furthermore, there is no suggestion or teaching in Niikura, Hewlett or Brechner as to how the features of the three devices

could be combined so as to meet the structured claimed in Claim 22. Thus, the invention by the Applicant is not obvious, since it does not come from the prior art. Therefore, Applicant respectfully requests the Examiner to withdraw and remove this rejection.

Thus, Applicant believes that this claim is ready for allowance based on all elements recited in Claim 21 and reasons stated above. Therefore, it is respectfully submitted that Claim 21 defines over subject matter in Niikura, Hewlett and Brechner. Applicant respectfully requests the Examiner to reconsider and withdraw this rejection.

New Claim 23 is directed toward a video segmentation system for automatic video indexing by identifying shot transitions using a wavelet decomposer. It recites, *inter alia*, that a video source provides a video sequence that includes a plurality of frames each including multiple pixels. It also recites a frequency decomposer that is connected to the video source and generates a plurality of low wavelet frequency signatures and a plurality of high wavelet frequency signatures for each said plurality of frames. Additionally, it recites a data structure for storing said plurality of low wavelet frequency signatures and said plurality of high wavelet frequency signatures to employ a matrix representing wavelet transform coefficients, where the plurality of low frequency signatures and the plurality of high signatures regarding the two adjacent frames are compared and an S-distance measurement is generated. Further, Claim 23 recites that a shot detector is connected to the video source and the frequency decomposer and identifies a shot transition between said two adjacent frames using the

low wavelet frequency signature and the high wavelet frequency signature stored in the data structure and the S-distance measurement. For the reasons discussed above with respect to independent claims 1, 21, and 22, applicants submit that new claim 23 is allowable.

New claim 24 depends from Claim 23 and is allowable for at least that reason.

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

Dated: July 6, 2005

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